

# ALSATOM MB1 MC, ALSATOM MB1/A MC

## INSTRUCTION MANUAL

(Edition January 2002)

CE0051

This unit is manufactured by ALSA APPARECCHI MEDICALI S.R.L. - CASTEL MAGGIORE - BOLOGNA - ITALY that answers for safety, reliability and performances only if the installation, additions, recalibrations, changes or repairs are effected by personnel authorized by ALSA and if the installation, additions, recalibrations, changes or repairs are effected by personnel authorized and only if the installation takes place in a room complying with relative prescriptions IEC or CEI and the unit is used in compliance with given instructions.

The Manufacturer will supply, on demand, the electric diagrams and will supply any further information needed.

**These instructions must be kept where the unit is employed, must be read from the operator before use and ask for them again to the Manufacturer in case missing.**

If the instructions are not exhaustive for the specific field, please contact the Manufacturer directly or through the local distributor, before using the unit.

### IMPORTANT

Every unit has specific features and so, before using it with a patient it is advisable to check carefully its working without trusting blindly to the previous experiences with others similar units.

### VERY IMPORTANT

**In accordance with the requests of the European directive for medical devices 93/42 CEE and according to the procedures of company quality system for the after-sale control of the production, the users have to inform, in detail, the Manufacturer about every little problem of this unit in order to attend it in a short time.**

### INTRODUCTION

In a biological tissue which is crossed by an electric current, are shown the following effects:

- Thermal - related to the specific resistance of the tissue, to current density and length of phenomenon;

- Faradic - due to the stimulus of electrically excitable cells.

- Electrolytic - for which in the tissue positive ions are pushed towards negative pole and vice versa

By using high-frequency alternate electric current, are eliminated two last not desired effects, taking best advantage from thermal effect.

In fact, when an electric current having such characteristics, flowing from active electrode to the neutral one, crosses with sufficient density the cellular liquid of the tissues warms it by producing as follows:

1) Heating is so quick that the pressure of created vapour in the cells breaks the membranes causing cutting;

2) Heating is lower, so the liquid slowly evaporates allowing coagulation of the tissue components which can be coagulated (coagulation or haemostasis);

3) The phenomenon is middle course between above said (blend cut).

Therefore, the electrosurgical units are 'high frequency units' which allow to 'destroy' cells of biological tissues, so they must be handled by expert staff only who knows very well all problems and risks concerning their use following, for safety, all instructions supplied by the Manufacturer.

### INSTRUCTIONS TO USE THE UNIT

ALSATOM models MB1-MC and MB1/A-MC designed for use in the field of minor and medium surgery, for all the operations that need powers not more than 150 Watts for the cut and monopolar coagulation and 60 Watts for the bipolar coagulation combined to a very fine and precision in the power delivery.

Units are suitable for:

- **GYNAECOLOGY:** .....for every kind of cut and coagulation or micro coagulation.

- **DERMATOLOGY:** .....for every kind of cut and coagulation or micro coagulation.

- **PLASTIC AND AESTHETIC SURGERY:** .....for every kind of cut and coagulation or micro coagulation.

- **OTORHINOLARYNGOLOGY:** .....for every kind of cut and coagulation or micro coagulation.

- **UROLOGY:** .....not for endoscopy use under liquid except for fulguration.

- **DENTAL SURGERY AND MAXILLO-FACIAL:** .....for every kind of cut and coagulation or micro coagulation.

- **ANGIOLOGY:** .....for every kind of cut and coagulation or micro coagulation.

- **GENERAL SURGERY:** .....for every kind of cut and coagulation or micro coagulation.

- **SPECIALITY SURGICAL:** .....for every kind of cut and coagulation or micro coagulation.

- **GASTROENTEROLOGY:** .....for every kind of cut and coagulation or micro coagulation.

- **VETERINARY:** .....for every kind of cut and coagulation or micro coagulation.

In particular, functions are the following:

- **CUT:** .....pure cut without coagulant effect;

- **BLEND:** .....cut with coagulant effect;

- **FORCED COAG:** .....coagulation with an high scintillation (fulguration);

- **SOFT COAG:** .....coagulation with a low scintillation and a marked action into the depths (desiccation);

- **BIPOLAR:** .....bipolar coagulation;

### GENERAL PRECAUTIONS, it's dangerous to not comply with the following:

1. It's dangerous to use the unit if the electric system and the installations of the operating theatre do not comply with the safety standards in force:  
Do not use 'extensions' for the supply cable and when use at the same time several apparatuses ask to Technical Office for the compatibility.
2. It's dangerous to use old accessories or not supplied by the Manufacturer.
3. The interference on other electromedical equipments is regular when apparatus works.
4. Please remind that when operate on patient wearing pace-makers or pace-maker electrodes, these last may be troubled or damaged (to cause fibrillations and so on)(Please address you to the Cardiology Dep.).
5. Take off all metal items from the patient: rings, chains and so on and don't use the unit with inflammable anaesthetic gas (ex. oxygen and nitrous oxide and so on) especially in case operate in cavities (thorax, abdomen, trachea, head, and so on)
6. Don't use or evaporate, before the operation, cleaning substances, disinfectants or inflammable solvents. Always carefully remove any possible stagnation from body's depressions or cavities (navel, vagina, and so on) as well as under the patient. Remind that during the use a spark may cause the burst of endogenous gas (intestine) or set materials saturated with oxygen (cotton, gauze and so on) on fire.
7. Avoid the touch of earthed metal parts or electricity conductors with the patient (tables, supports et cetera) and insulate the body's parts at strong secretion and the skin to skin contacts (for ex. between arm and body) by means of dry cloth.
8. Always keep eventual monitor electrodes not properly protected as much as possible away from those of electrosurgical unit. It's certainly advisable against using needle monitor electrodes or small size electrodes.
9. Set neutral electrode as follows: \* Check its perfect conditions and choose the nearest body's part to the operating area (the best is a soft part, without hairs, osseous protuberances or superficial inhomogeneity). Clean, shave and massage it to help the circulation.  
\* Set the electrode very well without interpose anything making sure the best possible contact on the whole surface, but without pushing too much to not create ischaemic zones (use, in case, conductive gel and so on) and always check during the operation good and homogeneous contact at all time

particularly in case the patient is moved or liquids are poured.0. The position of neutral electrode as to the operating area produces a run to the H.F. current. Remind that eventual metal items (prostheses, catheters, and so on) on that area may cause too strong current condensations, so following a warming, till the burn of the nearest tissue.

11. The connection cables of the unit's electrodes have not to touch the patient or other conductors.
12. Always use the lowest possible power in relation to the operative necessities.  
An eventual poor efficiency of the apparatus, compared with the usual run, may be done by: incorrect position or poor contact of neutral electrode, defect of the electrodes connections, bad conditions of active electrode; so verify these things before raising too much power.
13. To operate on small size areas or cavities, use bipolar technique to avoid too wide and not wanted coagulations.
14. When the unit is put ON don't set at direct contact the active electrode with the neutral one (short circuit) and reduce at min. the time when active electrode doesn't touch the tissues - it might cause detrimental warming or reduce the life of the unit. On this connection, please follow as much as possible the suggested work times.
15. To use 'disposable electrodes' address you to the Technical Dep.
16. In case of supply mains lack, set all controls to ZERO and put OFF the unit.

#### THE POSITION OF PATIENT AND NEUTRAL ELECTRODE

By using an high-frequency surgical apparatus by monopolar technique it's very important the all current reaching the patient returns correctly to the unit by means of neutral electrode.

To forget to apply neutral electrode or wrong application, causes two big troubles:

1. High-frequency current discharges from the patient through an insufficient part of the same neutral electrode or by means of casual contacts of conductive items (operating table, wet clothes, supports, and so on) so, because these are contact surfaces relatively small, the density of current crossing them may be such as to cause some burns.
2. Power delivery of the unit may lower considerably.

For above reasons **it's very important** that neutral electrode is used by keeping in mind all indications detailed on points 7, 8, 9, and 10 of the par. 'GENERAL PRECAUTIONS'.

On this connection must be also reminded that the phenomena usually named 'shocks' may be of concern of electrosurgical units' use and normally they are very slight stimulation phenomena or small radio-frequency discharges depending on the same contact between the operator and patient.

In most cases said phenomena don't happen or, at least, are such as to not be noticed, but in case they happen it's advisable that the operator avoids direct contacts with patient (for ex. use surgical gloves as insulating) and, if possible, has not earth contacts (use clogs, insulating chair, and so on).

#### THE PRINCIPLES OF CUT AND COAGULATION

As already stated on the introduction, the electrosurgery takes best advantage from thermal effect in the tissues of high frequency current to coagulate or cut them.

Coagulation happens when the current 'reaches' the tissues with a 'density' limited enough such as to allow infra an extra cellular liquids to evaporate slowly, so there is the coagulation of the components of the tissues which can be coagulated that during this process tend to contract, closing and blocking the blood-vessels.

Cutting of the tissues, on the contrary, happens when the current has a 'density' more higher, so warms the tissues at a such quickness and temperature so that the liquids inside them don't succeed in evaporating slowly and produce a so high pressure to explode cellular membranes and consequently destroy them, so destroying the same tissues too.

Finally, blend cut happens when the phenomenon is a middle course between above said.

The components concurring to produce said processes are essentially two:

- the kind of current delivered by the unit - the kind of electrode used.

Delivered current depends on technical characteristics of the apparatus, so the operator cannot interfere on them by no means except in power adjusting, whereas the choice of the electrode depends on his will, so it's advisable to have exact information about.

More suitable electrodes for pure or blend cut are, of course, the ones having smaller section (needle type, knife, loop with thin wire, electrodes for uterine conization, polypectomy et cetera) because they concentrate the current on a very exact point, so help considerably to raise its 'density' on the application point.

On the contrary, the electrodes more suitable for coagulation are the ones having larger section (round end, and so on) since help to lower the 'density' of the current on the application point.

#### PRACTICAL PROPOSALS

By keeping in mind general indications stated on the previous par., it's possible to give a series of practical proposals to get the optimum units' running by reducing all problems that their use concern.

First of all, there are three general indications to keep in mind at any circumstance, that is to say:

1. Do not activate the unit before active electrode is in touch with the tissues, otherwise some electric arcs are produced which carbonise them superficially, then preventing from good cicatrization.
2. Keep active electrode clean as much as possible otherwise may be produced some sparks or superficial carbonisation's of the tissues. Dirty patina on an electrode tends to insulate it in a way such as to determine even a lowering of the power delivery because of poor contact between said electrode and the tissues. Always use the lowest possible power. In fact, to use too high power allows to have quicker surgical action, but causes superficial discharges, sparks and flashes and certainly produces superficial carbonisation's.

**Pure cut (for biopsy, laparoscopy, tissues extirpations, cut or skin incision, uterine conization, in gynaecology etc., in general for any case needing cut without coagulating effect).**

1. Use small size electrodes, such as for ex.:  
E7 'thin needle electrode' (from 3 ÷ 4 W)  
SAD, SAD/1, SAD/2, SAD/3 'extra-fine needle electrodes' not insulated, with diam. from 0.10 to 0.40 mm (from 3 ÷ 4 W)

E42, E43, E44, E45 'long type electrodes' with different ends (from 10 W)

All LLETZ type electrodes for gynaecology from E50 to E58 (from 10 W)

2. Select 'CUT' current and, in case, get quick as much as possible sliding of the electrode on the tissue.

**Blend cut (for laparoscopy, polypectomies, papillomies, fistulas, haemorrhoids, in general for any case needing cut combined with an effective coagulating effect).**

1. Use the electrodes already mentioned for pure cut or, if possible, the one provided with bigger section, such as for ex.:  
E1 'knife electrode', E5 'thick needle electrode' (from 4 ÷ 5 W)
2. Select 'BLEND' current and, in case, slow as much as possible sliding of the electrode on the tissue.  
In case coagulating effect is not sufficient, use coagulation currents too, the better is 'FORCED' type.

**Micro Coagulation (for ex.: in dermatology, epilation, telangiectasis, spider naevi, pointformed red-ruby angiomas, etc.).**

1. Use extra-fine needles: AID 'insulated needle' (the best for epilation), all SAD 'long type, not insulated needles' above mentioned for cut too.
2. Select 'SOFT COAG' current (from 0.5 W)

## Coagulation

For coagulation there are two possibilities:

FORCED COAG: with sparking 'fulguration or spray type'

SOFT COAG: without sparking.

The current 'SOFT COAG', usually combined with bigger size electrodes, is more suitable for coagulations with deep effective effect, but with limited superficial sparking, such as for ex.:

- Coagulation by means of surgical forceps (from 10 W)
- Coagulation by round end electrodes in endoscopy, included the urological one under liquid (from 10 W)
- All coagulations by ball type electrodes (available with diam. mm2 and 4 both short type: E12, E14, and long type: E46, E47) (from 10 W)

The current 'FORCED COAG', usually combined with small size electrodes, is more suitable for coagulations having lower deep effect, but better superficial efficiency, such as for ex.:

- Coagulations by loop electrodes for polypectomies and urological endoscopy under liquid (from 4 ÷ 5 W)
- Coagulations by above mentioned electrodes for cut and blend cut, for gynaecology too (from 4 ÷ 5 W)
- Superficial coagulations in dermatology (from 2 ÷ 3 W)

Of course the current 'FORCED COAG' may be used by more suitable electrodes for the SOFT one and vice versa even if is lost a little specific effect, so it's certainly useful to get personal experience.

**Bipolar coagulation (for use by bipolar forceps, bipolar electrodes for laparoscopy or endoscopy, for spider naevi coagulation by double needle method, and so on)**

1. Use bipolar forceps or bipolar electrodes (the needles for microcoagulation for spider naevi).
2. Select 'BIPOLAR' current (from 0.5 ÷ 1 W)
3. Please remind that during the operation is very useful to reduce 'sticking phenomena' of the tissue on the points of bipolar forceps, to clamp them as little as possible, reduce at max. the time of power delivery and keep them moistened by physiological solution (or plunged inside a cup or on a imbibed gauze).

## Power adjusting

All different powers may be adjusted in micro scale (0,5 Watt p/time from 0,5 to 5 Watts, 1 Watt p/time from 5 to 10 Watts, 2 Watts p/time from 10 Watts to max.).

So, at first by starting the use of the apparatus it's advisable to start from the lowest values of power, then raising gradually up to desired results.

On this subject it's important to remind that for pure cut (first of all by loop electrodes or for conization) by reaching a certain power level (that may change according to the sizes of the same electrode) we start to obtain cut phenomenon, but it presents again a certain 'sticking' of the tissue on the electrode. The optimum adjusting is obtained by raising a little again power by subsequent increments of 5, 10 Watts p/time.

## RUNNING

Every time you switch on the apparatus, the microcontroller does automatically an auto test (of about 15 seconds) to verify anomalies of working (if present). If everything is all right you will have in sequence:

- 1) Lighting of 5 green leds of the working selector;
- 2) Lighting of the all power display and (only in mod. MB1/A) of the timer display;
- 3) Lighting of the red led (neutral plate alarm device) and yellow and blue leds (cut/blend cut and coagulation) with short acoustic signals;
- 4) At the end, if everything is all right, you will have a short acoustic signal (on the display appears first the software code, then indication "power O").

The auto test stops if reveals anomalies.

The system runs also (during the working) to prevent possible risks (because of internal breakdowns) stopping the output power and giving specific codes.

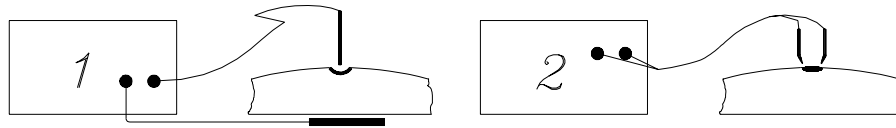
(SEE TABLE)

kind of anomaly	acoustic signal	display code
RAM memory during auto diagnosis	1kHz 70ms ON 130ms OFF	EA
EPROM memory during auto diagnosis	1kHz 70ms ON 130ms OFF	Eb
supply voltage during auto diagnosis	1kHz 70ms ON 130ms OFF	Ed
RF signal modulation during auto diagnosis	1kHz 70ms ON 130ms OFF	Ec
supply voltage during working	1kHz 70ms ON 130ms OFF	Ed
RF signal modulation during working	1kHz 70ms ON 130ms OFF	Ec
variables check failure	1kHz 70ms ON 130ms OFF	EE
failure about foot pedal signal	1kHz 70ms ON 130ms OFF	EF
neutral plate device control	1kHz 190ms ON 190ms OFF	-

**ATTENTION PLEASE: WHEN YOU SWITCH ON THE APPARATUS, IF THE LED DISPLAY DOESN'T LIGHTEN, DON'T USE THE APPARATUS AND CALL THE TECHNICAL SERVICE.**

1. **Monopolar mode:** by active electrode and neutral electrode for pure cut, blend cut and coagulations. In this case the current flows from active electrode to the neutral one, so the phenomenon concerns the zone around exact application point of active electrode.
2. **Bipolar mode:** without neutral electrode for coagulation only. In this case the current flows from a point to the other of the kind of electrode employed, so the phenomenon concerns only the part of the tissue included between the points of the same forceps. For this reason this method results very interesting when there is the necessity to operate on delicate tissues trying to damage as little as possible.

In both cases mod. MB1/MC works by pedal switch only, mod. MB1/A MC works both by pedal switch only and automatic control of activation



times

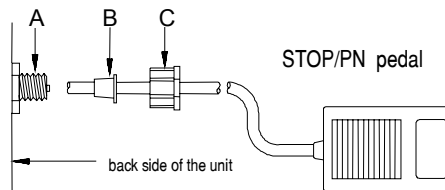
#### NEUTRAL ELECTRODE SAFETY CIRCUIT.

The unit is equipped with a checking circuit for neutral electrode connection that, when choose monopolar performances, operates (in case neutral electrode is not connected or its cable is broken) by stopping power delivery with intermittent acoustic signal and red warning light.

This circuit doesn't operate when choose bipolar coagulation, but it will light up red warning light.

#### USE

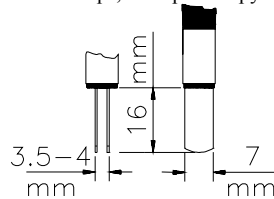
1. Check that the supply mains corresponds to technical data on the back of the unit and connect it by mains switch (1) OFF.
2. Connect the pedal to the unit by inserting the ring (C) and the gasket (B) in the pedal's tube (when packing the unit (C) and (B) are join to (A). Insert the tube in the socket (A), pushing the gasket (B) and screw the locking ring (C) **without pressing the same pedal**.



The switch works pneumatically, without electric current, therefore it is waterproof and explosion proof..

3. Connect the electrodes as follows:
  - neutral electrode to the socket 4.
  - Active electrode to the socket 5.
  - Bipolar electrode (without any polarity of the pins) to the socket 6.

To bipolar cable may be connected all kind of forceps, for laparoscopy too, provided with the following connection:



4. Monopolar electrodes and the bipolar one may be connected at the same time (then the outlets are activated alternatively according to the running).
4. Put ON the unit by switch (1) (see par. 'NEUTRAL ELECTRODE SAFETY CIRCUIT').
5. By button S of control 2 choose desired performance/s (see par. 'PRACTICAL PROPOSALS') by arranging initial power (that can be changed during the operation, when do not push pedal switch) by the following way:  
set for ex. on 'CUT' pos. and adjust power (change is slow by pushing the buttons once, quick by pushing them during some instants), then set on subsequent performances and proceed in the same way. Different powers are kept stored during all time that the unit is ON.
6. Activate delivery by pushing the pedal switch (for running by timer in mod.MB1/A MC see respective par.) and by using the button S to change from a performance to the other.  
Regular running is shown both by acoustic and light signal (yellow light and acoustic signal grave for cut, blue light and high-pitched acoustic signal for coagulations).

**Attention please: when push pedal switch in a function with power '0', there is alarm acoustic signal.**

#### AUTOMATIC TIMER IN MOD. MB1/A MC.

It has been proved that to have the possibility to adjust very finely output time (by reaching times of hundredth of a second perfectly repeated) it's essential to reduce at max. thermal effect of the current on the tissues, in order to carry out extremely delicate, precise and otherwise unachievable operation that in many cases, first of all in dermatology, (telangiectasis, spider naevi, angiomas, small neoformations, epilation, an so on) allow to operate even without anaesthesia. In addition, this running allows to the operator to repeat perfectly and the absolute personalization of the method to be employed (or shorter times with higher powers or vice versa).

Model MB1/A MC, in addition to the pedal switch only, is equipped with an automatic timer (adjustable from 1 to 99 hundredth of a second) at double mode: simple pulses or continuous super-pulsed mode.

The first is useful when method needs simple pulses or more simple pulses (ex. epilation), on the contrary the second results very efficient when is needed normal working composed by continuous series of pulses (with active times equal to pause times) as for ex. in bipolar coagulation, cut, diathermic peeling, verrucae, and so on)

Running is the following (controls 10):

1. When display is OFF the unit works by pedal switch only.
2. For simple pulses mode push once button T (display will light up) and adjust the length of pulse by respective buttons (change is slow or quick as per power).  
Then push pedal switch (at each activation corresponds a delivery time equal to the one pre-selected.)
3. For continuous super-pulsed mode push twice button T (display will light up and flashes) and adjust the length of pulse according to the point 2.  
Then push pedal switch (during all activation time delivery will be pulsed with pulses length equal to the one pre-selected and same passive times).Remind that when push pedal switch display doesn't flash.
4. To deactivate timer push button T up to when display is OFF.  
To set super-pulsed mode it's advisable first of all adjust pulses length by simple pulses mode.

## LEJEUNE BIPOLAR RUNNING

The unit may be used, in addition to traditional, very delicate bipolar coagulation, even by stronger bipolar mode to be able to obtain cut, blend cut and coagulations by employing bipolar electrodes (forceps with very thick points, electrodes for laparoscopy, and so on) and, for ex., it may be very useful in laparoscopy or veterinary.

Running is the following:

1. Connect to the sockets 4 and 5 adapter cable RB and to this last (without any particular polarity of the pins) bipolar electrode cable.
2. Then use the unit according to the points 1, 2, 4, 5, 6 of 'USE'. Performances and powers are the same.

## LITTLE GUIDE FOR MALFUNCTIONING

### PEDAL SWITCH

The pedal switch of the unit is air-type and, therefore, a little leak may cause the following problems:

- 1) the unit doesn't work;
- 2) irregular activation (sometimes yes, sometimes not or only for some seconds).

If the unit (correctly running) has above problems, you can proceed in the following ways:

- a) check if the pedal is well connected to the socket;
- b) check if the pedal (C) is broken: disconnect and activate the unit by pressing in the central hole of the socket (A) with a point (round or flat in order not to piercing the inside diaphragm of the socket).

If the unit works regularly, probably the cause is the pedal. Seldom, the cause can be the seal (B) or the inside diaphragm of the socket and, in this case, you have to contact the technical assistance.

**We remind you that in case of little leaks the problem can be felt only by pressing the pedal over and over again or pressing it for a long time.**

### EMERGENCY ACTIVATION

If during a surgical operation the pedal breaks, you can follow the procedure described above, point b), to effect an emergency activation.

### GENERAL PROBLEMS

We remind you that the unit has a self-control system both at the start and during the working with a specific information list that you can find in the manual. These problems have to be solved by the technical assistance, except for those concerning the neutral plate which depend on:

- 1) wrong (not correct) or missed connection;
- 2) breaking of the cable (you can try to move and bend it, especially near the plug or near the neutral electrode).

Moreover, you can have also the following cases:

- |                        |  |
|------------------------|--|
| Problem A)             | at the start the unit finishes the self-control phase regularly, but after, by pressing the pedal switch, it doesn't work (no sound and light signals) or it works irregularly       |
| First intervention A)  | please see <i>problems of the pedal switch</i>   |
| Problem B)             | at the start the unit finishes the self-control phase regularly, you press the pedal switch and everything works regularly, but the power doesn't come out or it is lower than usual |
| First intervention B)  | check the contact between the neutral electrode and tissues of the patient (if there is no contact you do not have power). Remember that the fur of the animals is insulating.       |
| Second intervention B) | check if all the active electrodes are in a good condition (not damaged) and check if they have a good contact with the electrodes-holder handle.                                    |
| Third intervention B)  | check if the cable of the electrodes holder handle is broken (moving and bending it near the plug and near the handle).  |

The user of the unit can not do anything more as described above, you have to apply to the technical assistance.

**It is very important to remember that using an electrosurgical unit you can have some common problems such as: little burns or neuromuscular stimulations of the patient or of the user which can be felt like "shock". All these problems, generally, do not depend on the damages of the unit, but depend on the user who doesn't follow the recommended procedures and so, we ask you to read carefully the manual.**

## CLEANING, STERILISATION, MAINTENANCE

1. Clean the unit by neutral soap solution taking great care because **doesn't go inside any liquid** and wipe it by dry cloth.
2. **Attention: at the moment of the sale the accessories are not sterile.** The electrodes-holder handle (MPE/S) and active electrodes are sterilizable by autoclave (cycle suitable for the gloves 120°C for 20 minutes) by cold solutions (ex. 'Cydex'). It is possible to boil too, but please consider that this is not the best way because may cause sediments and oxidation on electric contacts.  
Neutral electrode (EIP/9) is sterilizable by cold solutions.  
During sterilisation do not bend too much the connection cables and wipe perfectly all accessories' parts before use to remove trails of humidity; for this purpose, the best is centrifuge them.
3. When the unit is not used, keep it in a dry place, with not too much dusty, with a middle temperature (as for working) and take due care because on it is not poured any liquid.
4. Submit the unit for a periodic overhaul (yearly at least) to a specialised staff, better to the same Manufacturer, and always check perfect conditions of the accessories, otherwise their use is dangerous (ex. broken cables, pins clamped by jury means, dirty electrodes, and so on).

## ATMOSPHERIC CONDITIONS

### of use

Temperature (°C)	+10 ÷ +40
Humidity	30% ÷ 75%
Pressure (hPa)	700 ÷ 1060

### of transport and storage

Temperature (°C)	-40 ÷ +70
Humidity	10% ÷ 95%
Pressure (hPa)	500 ÷ 1060

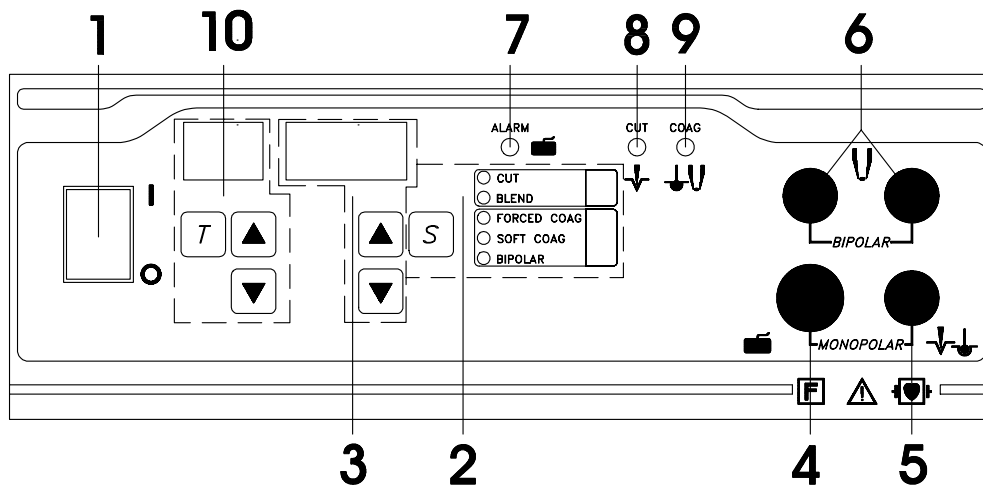
## STANDARD ACCESSORIES





MPE/S	- Sterilizable electrodes-holder handle with cable.
SEL/VI	- Set of 6 electrodes.
EIP/9	- Neutral electrode with connection cable.
FPE	- Fixing rubber belt for neutral electrode.
STOP/PN	- Pneumatic pedal switch.


#### ACCESSORIES ON REQUEST: see brochure .


There are also available other accessories, short or long type (insulated) for all several needs (dermatology, gynaecology, otolaryngology, dentistry, and so on) - see brochure. And also:


- RB - Adapter cable for Lejeune bipolar use.  
STOP/SALA - Pneumatic pedal switch with long cable and lateral support for use in the operating theatre.



-  Bipolar electrode  
 Pedal switch  
 Neutral electrode  
 Active electrode


 Attention please, read the manual

 Unit included in the Classification I type CF, protected against defibrillator effects. An apparatus included in such classification has an high degree of protection against direct and indirect contacts, particularly as concerns admissible leakage currents and with an applied part type F (floating out) isolated from the ground.

 This type of unit is specific for direct cardiosurgery application.

#### CONTROLS

- 1) Mains switch
- 2) Function selection (by pushing button S)
  - CUT-pure cut
  - BLEND-blend cut
  - FORCED COAG-spray coagulation
  - SOFT COAG-coagulation
  - BIPOLAR-bipolar coagulation
- 3) Powers adjusting
- 4) Neutral electrode connection
- 5) Active electrode connection
- 6) Bipolar electrode connection
- 7) Warning light of neutral electrode alarm (red)
- 8) Warning light cut and blend cut power delivery (yellow)
- 9) Warning light coagulation: forced, soft, bipolar (blue).
- 10) Controls for automatic timer (only for mod.MB1/A MC)

On the back: socket for connection pedal switch  and socket for the supply cable with fuses-holder

#### TECHNICAL DATA

- \* Electronic generator complying with Standards CEI EN 60601-2-2 (IEC 601-2-2 ed. 1991)
- \* Monopolar and bipolar Work frequency: 475 kHz.
- \* Classification: I type CF-Output circuit 'floating out' isolated from ground at high and low frequencies.
- \* Mains supply, absorption and mains fuses: see data on the back plate.
- \* Running by pedal switch with acoustic signals and warning lights.
- \* Neutral electrode safety circuit with alarm acoustic signal and warning light
- \* Power adjusting: by push-buttons , shown on display in percent scale.
- \* Protection against liquid access: usual, cabinet not protected.
- \* Convection cooling, without fan - not continued running 10s ON/30s OFF.
- \* Running checking circuit - by microprocessor.
- \* Dimensions and weight: cm. 31x28x11 - Kg. 7.8.
- \* Timer circuit (adjustable from 1 to 99/100 of sec.) at double mode: simple pulses or continuous impulsed (only for mod.MB1A-MC)

#### POWERS, IDLING V<sub>pp</sub> AND PEAK VALUES

- Cut: 150 WRMS at 500 ohm (V<sub>pp</sub> 956, cf 1.83)  
Blend: 140 WRMS at 500 ohm (V<sub>pp</sub> 1519, cf 3.02)  
Forced coag: 70 WRMS at 500 ohm (V<sub>pp</sub> 3000, cf 7.04)  
Soft coag: 140 WRMS at 500 ohm (V<sub>pp</sub> 1200, cf 2.54)  
Bipolar: 60 WRMS at 100 ohm (V<sub>pp</sub> 296, cf 1.55).

**CURVES OF POWER CHANGES BY CHANGING THE LOADS (FROM 50 TO 2000 OHMS)**  
**CURVES OF POWER INCREMENT (WITH NOMINAL LOAD)**

